Observations of Hydration and Dehydration in the Winter 2000 Arctic Stratosphere

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Abstract. During the January 2000 deployment of the SAGE III Ozone Loss Validation Experiment (SOLVE), the NASA ER-2 aircraft intercepted air parcels with unusual water mixing ratios within the Arctic polar vortex. Simultaneous *in situ* measurements of H_2O by the JPL Laser Hygrometer and N_2O by the Aircraft Laser Infrared Absorption Spectrometer were used to infer up to 0.5 ppm hydration (approximately 10%) at 18 km pressure-altitude (70 hPa) on January 31, 2000. Additionally, up to 0.5 ppm dehydration was inferred at a higher altitude of 20.6 km (50 hPa) on January 27, 2000. The thermal histories of these air masses are studied using back-trajectory analyses. This redistribution of H_2O within the Arctic polar vortex affects the frequency and location of polar stratospheric clouds.

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